

FIG. 1

Biomass

High-concentration sulfuric acid

1 Spraying/mixing

2 Kneading

3 Pretreatment

4 Saccharification treatment

Washing filtrate

Washing water

5 Filtration

Lignin

Filtrate

6 Sugar-acid separation

Saccharification liquid sulfuric acid

7 Monosaccharification treatment

Sugar liquid

8 Sulfuric acid recovery/concentration

High-concentration Sulfuric acid

FIG. 2

Biomass

High-concentration sulfuric acid

1 Spraying/mixing

2 Kneading

3 Pretreatment

4 Saccharification treatment

Washing filtrate

Washing water

Low-concentration sulfuric acid

5 Filtration

Lignin

Filtrate

6 Sugar-acid separation

Saccharification liquid

Low-concentration sulfuric acid

High-concentration sulfuric acid

7 Monosaccharification treatment

Sugar liquid

8 Sulfuric acid concentration

Low-concentration sulfuric acid

High-concentration sulfuric acid

FIG. 3

biomass

High-concentration sulfuric acid

Water for hydrolysis

Hydrolysis slurry

FIG. 4

Biomass

Decrystallization (1)

Hydrolysis (1)

Filtration (1)

Solid

Filtrate (1)

Filtrate (2)

Sugar-acid separation

Sugar liquid

Decrystallization (2)

Hydrolysis (2)

Filtration (2)

Lignin

Sulfuric acid